

7.15

**STANDARD OPERATING PROCEDURES
FOR THE COLLECTION AND PROCESSING
OF FISH TISSUE PLUG SAMPLES
FOR MERCURY ANALYSIS**

Summary

Because fish spend their entire life in a particular water body they can be important indicators of water quality, especially toxic pollutants (e.g., pesticides and trace elements). Toxic pollutants which may be present in the water column or sediments at concentrations below our analytical detection limits may be exhibited in fish tissue analysis due to bioaccumulation.

Typical fish tissue collection methods require the fish to be sacrificed, whether it be a whole fish or a skin on fillet tissue sample. This can be problematic when there is a need to collect large trophy sized fish for contaminant analysis or when a large sample size is necessary for statistical analysis. The following describes an alternative method for the collection of fish tissue samples which uses a tissue plug instead of a skin on fillet. This method is advantageous in that it eliminates the need to kill the fish to obtain a fish tissue sample for mercury analysis. Secondly, skin on fillet sampling required homogenizing of samples through a grinder. Although the grinder is cleaned between samples, the risk of sample contamination is a concern. The plug method uses clean equipment and supplies each time a sample is collected, thus reducing the risk of sample contamination.

In general, a plug tissue sample is collected by inserting a biopsy punch into a de-scaled meaty section of a live fish. After collection antibiotic salve is placed over the wound and the fish is released.

Field Equipment and Supplies

- ☐ Fish measuring board.
- ☐ Fish weigh scale.
- ☐ Plastic bags.
- ☐ Sterile 20 mL glass scintillation vials.
- ☐ Coolers with ice or frozen gel packs.
- ☐ Field data forms (Figure 7.15.2).
- ☐ Sample log forms (Figure 7.15.4).
- ☐ Sample labels (Figure 7.15.3).
- ☐ Latex gloves.
- ☐ 8 millimeter disposable biopsy punch (Acuderm brand Acu-Punch or equivalent)
- ☐ Laboratory pipette bulb.
- ☐ Antibiotic salve.
- ☐ Pen.
- ☐ Fish collection gear (nets, etc.).

Field Procedures

1. Collect up to five fish per species of similar size ranges. Size ranges should be visually obvious. As a general guideline, the largest and smallest fish within each group should not exceed the average length of the group by more the 25%.
2. Acceptable methods for fish collection include: hoop net, electro-fishing, trap net, hook and line, or any method in which the fish sample will remain alive. However, methods in which the fish is sacrificed may also be used. These include: rotenone, gill netting, or any other method which provides fresh fish in good condition, without contamination from analyte compounds or substances which interfere with analyte compound identification or analysis.
3. For each sampling location (e.g., lake, lake region, stream or river reach), record the location, date, time, collection method, collector, and any other information the collector deems necessary on fish tissue log (Figure 7.15.2).
4. For each fish sampled, record the species, length, weight, and sample identification number on the fish tissue log (Figure 7.15.2). Also, note any anomalies (e.g., lesions, cuts, sores, tumors, fin erosion) observed on the fish.
5. On the left side dorsal area of fish (Figure 7.15.1), clear a small area of scales.
6. Wearing clean latex gloves, insert the 8 millimeter biopsy punch into the fish through the scale free area. The punch is inserted with a slight twisting motion cutting the skin and muscle tissue. Once full depth of punch is achieved a slight bending or tilting of the punch is needed to break off the end of the sample. Remove biopsy punch taking care to insure sample remains in the punch. **Note: The sample should result in a minimum of 0.5 to 0.7 grams of fish tissue for mercury analysis.**
7. Apply a generous amount of antibiotic salve to the plug area and gently return the fish to the water.
8. Using a laboratory pipette bulb placed on the end of the biopsy punch, give a quick squeeze, blowing the tissue sample into a sterile 20 milliliter scintillation vial.
9. Dispose of gloves and biopsy punch.
10. Label vial (Figure 7.15.3).
11. Immediately place vial in a plastic bag and put the bag and its contents in a cooler on ice or jell packs.

12. Fill out Sample Identification/Custody/Record form (7.15.4).
13. Place samples in freezer within 48 hours to await analysis.

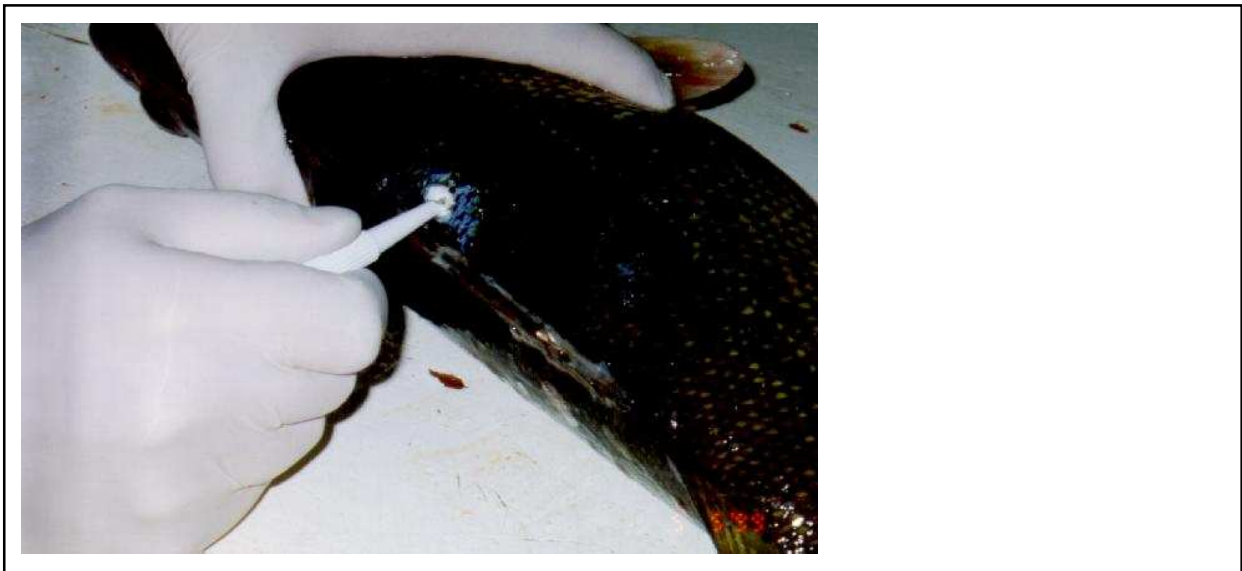


Figure 7.15.1. Location of plug sample.

[illegible]

Figure 7.15.2. Fish tissue data form.

Sample ID	Project Code	Project Description
Analysis: (DC Code) SW-Analyte Group		
Fish Species	Composite Size	Composite Weight
	Type of sample	Preservative
	Container:	
Date: _/_/_	Time: _:	Depth: __
Sampler	_____	

	Project Code	Project Description
389995		
Analysis: (DC Code) SW-Analyte Group		
Fish Species	Composite Size	Composite Weight
	Type of Sample	Preservative:
	Container:	
Date: _/_/_	Time: _:	Depth: __
Sampler	_____	

Figure 7.15.3 Fish flesh label, and fish flesh split label.



North Dakota Department of Health
Sample Identification Record
Division of Laboratory Services–Chemistry
Telephone: 701.328.6140
Fax: 701.328.6280

Surface Water Sample Identification Code R (Tissue samples)

Samples received without this sheet or without all bold sections fully completed will be rejected and not analyzed.

Sample Collection/Billing Information

Account #	Project Code:	Project Description:		
Customer (Name, Address, Phone):				
Date Collected:	Time Collected:	Matrix: Tissue	Site ID:	
Site Description:				
Alternate ID:		Collected By:		
County Number:	County Name:			
Comment:				
Comment:				

Field Information/Measurements

Species Name:	Species Code:	Tissue Type:		Sample Size:
Comment:		Min. Length (cm):	Max. Length (cm):	Ave. Length (cm):
		Min. Weight (g):	Max. Weight (g):	Ave. Weight (g):

Analysis Requested

<input type="checkbox"/> 76) Mercury			
<input type="checkbox"/> 77) Base/Neut. Pest			
<input type="checkbox"/> 78) Trace Metals			
<input type="checkbox"/> 106) Acid Herbicides			
<input type="checkbox"/> 107) PCBs			
<input type="checkbox"/> 112) Urons			
<input type="checkbox"/> 113) Carbamates			
<input type="checkbox"/> 143) PAHs			

Figure 7.15.4 Fish sample custody form.